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Memorial to Bill Hamilton

The initiative for this most interesting meeting on the *Origins of HIV and the AIDS epidemic* came from Bill Hamilton. Ordinarily, The Royal Society's Discussion Meetings are proposed and planned on a rather leisurely time-scale (typically two years or more). It is characteristic of Bill's thinking 'outside the envelope' that he proposed this meeting on a properly more urgent basis, stressing its importance not only for scientific understanding, but for potentially larger social questions. Learning by doing, The Royal Society is now reshaping its procedures explicitly to encourage Discussion Meetings of this kind in future.

Sadly, Bill could not be with us in person—although he certainly was in spirit—at the meeting. His unexpected death on 7 March 2000, following hospitalization for malaria on his return from Africa, casts a long shadow.

Bill Hamilton was, unquestionably, the most influential evolutionary biologist of the second half of the 20th century. As he wrote of himself (Hamilton 1991), in an extraordinary essay entitled *My intended burial and why*, 'There seem to be people incurably fascinated by insects. I am one of them. The interest arises untaught in infancy and harsh experiences of childhood seem to do little to change it.' This 'fascination' began with acute observations in the field, but added extraordinary gifts of creative imagination and analysis. His first impact was in 1964, with the recognition that kin selection held the answer to one of the main riddles Darwin left unsolved, namely the evolution of the social insects (where, often, workers give up their own reproduction to rear a sister's brood). Bill was not the first to recognize that the 'individual' upon which natural selection acts is, in effect, yourself plus your gene-sharing relatives, each discounted by their degree of genetic relatedness to you. Thus, in Haldane's celebrated phrase, you could, sensibly in Darwinian terms, give up your life to save two brothers or eight cousins. But Bill went importantly beyond this abstraction-on-a-beer-mat, realizing that in haplodiploid systems an ant actually can be related more closely to her sisters than to her own offspring. This combination of theory and observation transformed our understanding of how apparently altruistic behaviour can arise by kin selection.

After this, a steady stream of further and utterly original papers followed: an explanation for peculiar sex ratios in certain invertebrate species; the geometry of the selfish herd; apparently strange patterns of dispersal of offspring in stable habitats; and much else. The number of papers is modest, but each opens a new door, often onto surprising vistas. Happily, we have Bill's own commentary on the earlier part of this intellectual journey, in *Narrow roads of gene land* (Hamilton 1996); this book reprints all his 15 papers up to 1980, each with an introductory essay giving retrospective commentary. Bill, unusually for our time, walked most of these narrow roads alone. It was only on reading this book that I realized how privileged I had been to be one of his very small band of co-authors. If you have not read the book, do so.

Bill's career took various twists and turns. My guess is that he may have been happiest during his decade and more at the Imperial College Field Station at Silwood Park. Here, under the sympathetic directorships of O. W. Richards, and later Dick Southwood, he was almost entirely spared administrative and teaching duties—which were not congenial to him—and left free to pursue his interests. From 1973 onwards, I spent the summers at Silwood Park, and I vividly recall the admiration and affection that staff and students had for Bill; he was, simply put, seen as a treasure. And he did play his own distinctive part in the life of the field station. It was he, for example, who introduced and maintained the population of *Heliconius* butterflies that enlivened the conservatory where morning and afternoon tea was taken. He then went on to spend several years at the University of Michigan, from 1978 to 1984, before returning to the Zoology Department at Oxford as a Royal Society Research Professor.

Wider recognition of his work grew super-exponentially (as shown, for example, in citations of the 1964 kin selection papers) following its popularization in Ed Wilson's *Sociobiology* (Wilson 1975) and Richard Dawkins' *The selfish gene* (Dawkins 1976). I think Bill welcomed the recognition, but did not enjoy the obligations of celebrity status that came with it. He always loved escaping into his field work, particularly in Latin America, and I guess that in later years the pleasure of 'getting away from it all' added to the primary pleasures of intellectual engagement with the natural world which were his essence.

Not the least of the messages we can learn from Bill Hamilton's scientific life is the need—in a world where, properly, we seek efficient and effective management of support for basic, curiosity-driven research—to cater for those who do not fit tidy patterns. Bill truly was a 'one-off', never to be fit into any assembly line. And people like him are hugely, disproportionately important. Our academic arrangements must never lose sight of that.

I end with an extended quotation which gives some sense both of Bill's poetic writing style (which infused all his scientific papers) and of himself. It is the last paragraph of the previously mentioned essay (Hamilton 1991):

> 'Soaked, I hurry to my dinner in the open iron-roofed canteen of Reserva Ducke. It is a chicken here too—fried, of course—but I am thinking more of the mysteries of the forest undertakers I have been watching and of *their* chicken and what they are doing with it. I think of how they sometimes bury their carcass entire, as a team, several pairs together, while other times, even though quite as many are present, they work to remove its flesh on the surface in the way I have above described. When they work together are they all siblings or cousins? Could they know about this? . . . Shivering a little I think of how, by the time I am old, all these secrets of their work will be known, of how easily, then, we will super-attract beetles if we care to from large areas of forest by means of foetid chemicals . . . I think how, by that time, I can confidently arrange what I have thought of. I will leave a sum in my last will for my body to be carried to Brazil and to the forests. It will be laid out in a manner secure against the possums and the vultures just as we make our chickens secure; and this great Coprophanaeus beetle will bury me. They will enter, will bury, will live on my flesh; and in the shape of their children and mine, I will escape death. No worm for me nor sordid fly, I will buzz in the dusk like a huge bumble bee. I will be many, buzz even as a swarm of motorbikes, be borne, body by flying body out into the Brazilian wilderness beneath the stars, lofted under those beautiful and un-fused elytra which we will hold over our backs. So finally I too will shine like a violet ground beetle under a stone.'

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